MARYLAND Educators' Survey
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2013 TELL
Maryland Survey

Research Brief

Spring 2013

Validity and Reliability Report

Instrument Background and Design

The current national policy context demands a more nuanced understanding of the association between teaching and student learning. Federal law, such as No Child Left Behind, and federal competitive incentive programs, such as Race to the Top, the Teacher Incentive Fund, and School Improvement Grants, drive the need to effectively identify under what conditions teachers contribute to student learning (Steele, Hamilton, & Stecher, 2010). Additionally, research from private organizations, such as the Bill and Melinda Gates Foundation's Measuring Effective Teachers Project (MET), increase the visibility and support of efforts to explain the relationship between teaching and learning.

This brief furthers the discussion by contributing to a growing body of research that specifically describes how teaching and learning conditions theoretically and empirically link to important outcomes including teacher retention and student learning. The purpose of this brief is to provide an overview of the research base documenting the association between teaching and learning conditions and outcomes of interest and to present a summary of the design and psychometric properties of the Teaching, Empowering, Leading and Learning (TELL) Survey instrument developed by the New Teacher Center (NTC). The information provided in this brief serves as the technical basis for additional analyses and reporting and will be referenced in future briefs. The intent of the teaching and learning conditions work is to inform policy and practice.

Research Base

Why do teaching and learning conditions matter? Teaching and learning conditions impact two significant areas of national interest, teacher retention and student learning. The following section summarizes the quantitative relationship between teaching and learning conditions and student learning and teacher retention. It is not intended as an exhaustive review.

Teacher Retention

Large-scale empirical studies present evidence that contextual factors matter for teachers' decisions about staying and leaving schools. In a meta-analysis of 34 studies, researchers suggest that teaching and learning conditions influence teachers' career paths more than previously documented (Borman & Dowling, 2008). Boyd et al. (2011) demonstrate that teachers' perceptions of the school administration have the greatest influence on teacher retention decisions. Other work finds similar effects (Pogodzinski et al., 2012).Studies also find statistically significant relationships between teachers' perception of school facilities and their plans to stay or leave (Loeb, Darling-Hammond, & Luczak, 2005; Buckley, Schneider, & Shang, 2004).

Researchers, specifically using TELL data from various states, confirm that teaching and learning conditions influence teachers' plans to stay. Johnson, Kraft, and Papay (2011) demonstrate that the conditions that matter most in deciding to stay include the school's culture, the principal's leadership, and relationships among peers. Ladd (2009), also using TELL data, documents that teaching and learning conditions predict plans to leave a school, independent of school demographics.

Student Learning

There are far fewer large-scale empirical studies exploring the association between teaching and learning conditions and student achievement. To date, work by Ladd (2009), Johnson, Kraft, and Papay (2011), and the MET Project examine this issue.

The analysis by Ladd (2009) shows that teaching and learning conditions predict student achievement in mathematics, and to a lesser degree, in reading. The Johnson, Kraft, and Papay (2011) research indicates that positive conditions contribute to improved student achievement. Both of these efforts use the TELL Survey data from various states to estimate the impact of teaching and learning conditions on student learning. Finally, the MET Project also examines the relationship between conditions and achievement using TELL Survey data. An initial study indicates that some teaching conditions predict student outcomes (Ferguson and Hirsch, 2013).

TELL Background and Structure

The TELL Survey originates from extensive work by the North Carolina Professional Teaching Standards Commission (NCPTSC) beginning in 2001. The NCPTSC conducted a literature review and analyses of state and national survey data from the National Center for Education Statistics' School and Staffing Survey in order to better understand the factors contributing to teacher satisfaction and employment trajectories. Based on these efforts, the NCPTSC identified the following areas: time, empowerment, leadership, decision making, and facilities and resources as related to future employment plans. The Commission created standards aligned with these areas, as well as administered a statewide survey in 2002 to assess if the standards were in place in schools.

The TELL Survey incorporates these constructs and includes others logically and empirically linked to outcomes of interest, teacher retention and student learning. These constructs include: student behavior support, community support, and instructional practices and support. Based on the NCPTSC-identified areas and an external validation study described below, the TELL Survey currently includes eight constructs. Exhibit 1 identifies the eight core TELL Survey constructs.

EXHIBIT 1. TELL SURVEY CORE CONSTRUCTS	
Construct	**Descriptor**
Time	Available time to plan, to collaborate, to provide instruction, and to eliminate barriers in order to maximize instructional time during the school day
Facilities and Resources	Availability of instructional, technology, office, communication, and school resources to teachers
Community Support and Involvement	Community and parent/guardian communication and influence in the school
Managing Student Conduct	Policies and practices to address student conduct issues and ensure a safe school environment
Teacher Leadership	Teacher involvement in decisions that impact classroom and school practices
School Leadership	The ability of school leadership to create trusting, supportive environments and address teacher concerns
Professional Development	Availability and quality of learning opportunities for educators to enhance their teaching
Instructional Practices and Support	Data and support available to teachers to improve instruction and student learning

NTC adds questions about general demographic information, beginning teacher support, as well as client-specific information to these eight core constructs on current TELL Survey administrations. Core TELL Survey responses are scored using Likert-type ratings ranging from strongly disagree (1) to strongly agree (4) and include a "Don't Know" option.

External Analyses of Validity and Reliability

This section describes the methods used by an external analyst to verify that the structure and items included in the TELL Survey result in meaningful and useful information. This work is part of the MET Project supported through the Bill and Melinda Gates Foundation (Swanlund, 2011). The Swanlund analyses use data from 286,835 educators from 11 states across the U.S. The external survey review examines both validity and reliability. These analyses identify patterns in the data that provide a clear structure for the survey and confidence for interpreting the results.

Validity

The term validity generally refers to the process of ensuring the survey accurately measures what it is intended to measure, in this case teaching and learning conditions. There are several approaches to testing validity. The external validity testing conducted for the TELL Survey assesses the structure of the response scale and the alignment between survey items and broader survey constructs as identified in Exhibit 1. The review uses the Rasch Rating Scale Model to examine the item-measure correlations, item fit, rating scale functioning, unidimensionality, and generalizability of the instrument.

Results from the external validity testing prompted several edits to increase the statistical stability of the TELL Survey. For example, a four-point rating scale was introduced that ensures appropriate scoring for both individual-level responses and school-level responses in place of the original six-point scale. Based on the external study finding that some survey constructs are more stable if broken into multiple constructs, an additional construct was added resulting in eight constructs. Additionally, the results indicate that some individual items overlap across survey constructs. For example, items found in the teacher leadership construct overlap with the school leadership construct and should be reviewed for each analysis.

Reliability

Reliability testing ensures the survey instrument produces the same results across repeated measures either within the same population or with a similar population. A reliable survey is generalizable and therefore is expected to reproduce similar results across settings. The external review analyzes reliability using both the Rasch model person separation reliability and Cronbach's alpha. The Swanlund (2011) study concludes the survey is capable of producing consistent results across participant groups.

For a detailed review of the methods and results from the external analyses, consult Swanlund (2011). In summary, the external analyses confirm the TELL Survey offers a robust and statistically sound approach for measuring teaching and learning conditions.

Internal Analyses of Validity and Reliability

In addition to the external analyses, NTC conducts internal analyses of validity and reliability to verify the stability of the instrument across survey populations as promoted by industry standards found in the Standards for Educational and Psychological Testing (American Educational Research Association, American Psychological Association, and National Council on Measurement in Education, 1999). Statistical tests of validity include conducting factor analyses and reliability tests include generating internal consistency estimates. It should be noted that the purpose of the validity and reliability analyses is to determine the best structure of the data for the 2013 survey administration.

The data for these analyses include 50,272 respondents out of a reported 86,440 school-based licensed educators and educational support personnel in Maryland, yielding a response rate of 58 percent. Respondents include several categories of educators: 75 percent are teachers, four percent are administrators, seven percent are other licensed educators, such as librarians and school psychologists, and 14 percent are educational support personnel. Exhibit 2 provides response rates by participant type.

EXHIBIT 2. RESPONSE RATE BY PARTICIPANT TYPE	
Respondents*	**Response Rate (N)** **Spring 2013**
Teachers	75.1% (36,434)
Administrators	4.0% (1,920)
Other Education Professionals	6.7% (3,266)
Educational Support Personnel	14.2% (6,896)

***Note**. There were 1,756 (3.5%) records with no position defined. The respondent category "teachers" includes instructional coaches, department heads, literacy specialist, etc. The respondent category "administrators" includes principals and assistant principals. The respondent category "Other Education Professional" includes school counselor, school psychologist, social worker, etc.

Validity

The validity analyses assess the degree to which the 2013 TELL Maryland Survey measures the eight theoretical constructs it is intended to capture. See Exhibit 1 for descriptions of the constructs. NTC conducts factor analyses to group variables with similar characteristics together. NTC performs confirmatory factor analysis (CFA), using principal components analysis and varimax rotation procedures, in order to verify the actual structure of the data reflects the expected structure from previous validity studies. The CFA specifies an eight factor solution.

Researchers suggest several empirical criteria for determining which orthogonal or correlated factors to retain in a stable instrument. These criteria are based on an eigenvalue. Eigenvalues indicate how much variation each factor or component can explain. The criteria include: scree plot, Kaiser criterion, and variance explained (Cortina, 2002). However, the final decision about which factors are retained should be based on judgments of interpretability and consistency of the factors with sound theory (Bandalos and Boehm-Kaufman, 2009). NTC provides information about each of the recommended empirical criteria.

The scree plot graphically represents the eigenvalues in descending order and connects them with a line. Researchers suggest examining the line for where it levels off. Exhibit 3 indicates an "elbow" beginning with factor two and continuing through factor eight or nine and then smoothing or showing that each additional factor beyond that accounts for smaller amounts of the total variance (Ledesma and Vlero-Mora, 2007). Therefore the scree plot would suggest approximately an eight to nine factor solution. See Exhibit 3.

EXHIBIT 3. SCREE PLOT
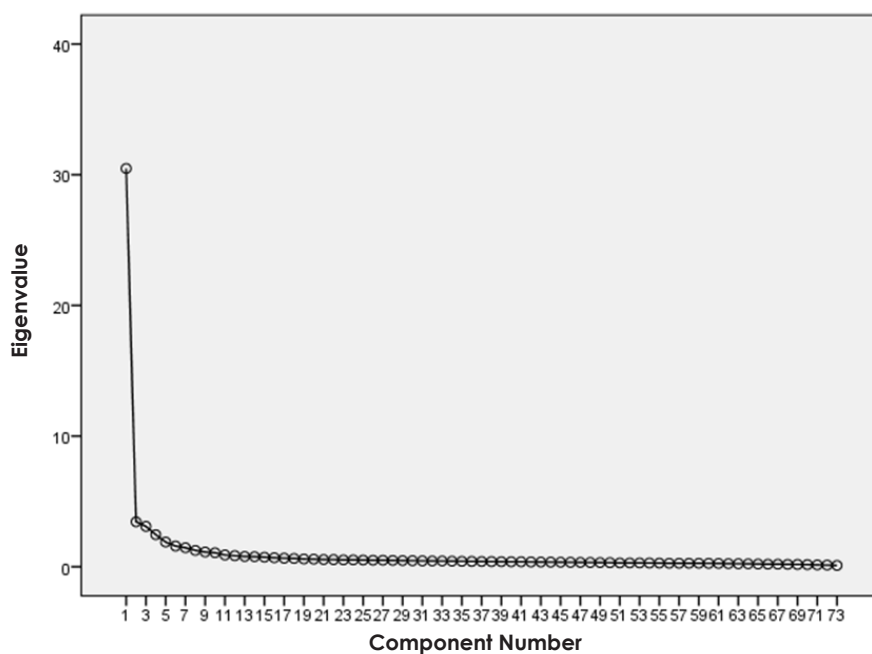
The Kaiser criterion (K1) suggest only including factors where eigenvalues are greater than one (as a theoretical lower bound). The initial eigenvalues displayed in Exhibit 4 show that the eight factors have a value of more than one and therefore meet minimal variance-explained thresholds. Another recommended approach for deciding which factors to retain suggests examining the variance explained and retaining factors contributing ten percent or more. Exhibit 4 shows that the eight factors each contribute at least ten percent of the variance and together, explain 63 percent of the variance. The empirical criteria reviewed together support an eight factor solution, including a general leadership category with a sub-category. Based on the TELL theoretical framework and within the bounds of the empirical criteria, following reports will employ an eight factor approach similar to the external validity work. The constructs include: time, facilities and resources, professional development, community support and involvement, managing student conduct, instructional practices and support, teacher leadership, and school leadership. For outcome analyses using teacher retention and student performance data produced later, NTC will include analyses exploring a variety of sub-constructs and combinations to determine best fit models.

Analyses of the data set suggest that the TELL Maryland Survey eight construct structure provides stable and generalizable measures of teaching and learning conditions, as well as is consistent with the theoretical framework supporting this work.

Reliability

The internal reliability testing for TELL Maryland confirms that the survey is generalizable and will produce similar results with similar populations. The reliability analyses for TELL Maryland produce Cronbach's alpha coefficients ranging from 0.83 to 0.95. Alphas normally range between 0.00 and 1.00. The closer the Cronbach's alpha coefficient is to 1.00 the greater the internal consistency of the items in the scale. Alpha coefficients above 0.70 are considered acceptable (George & Mallery, 2003).

As Exhibit 5 indicates, all eight alpha coefficients are high and above 0.70 confirming internal consistency of the TELL Maryland Survey constructs.

EXHIBIT 4. EIGENVALUES AND VARIANCE EXPLAINED			
	Initial Eigenvalues		
Component	Total	Percent of Variance	Cumulative Percent
1	30.481	41.755	41.755
2	3.441	4.714	46.469
3	3.089	4.231	50.700
4	2.457	3.365	54.066
5	1.890	2.590	56.655
6	1.584	2.170	58.825
7	1.457	1.996	60.821
8	1.253	1.717	62.537

EXHIBIT 5. RELIABILITY BY CONSTRUCT	
Construct	**Cronbach's Alpha**
Time	0.83
Facilities and Resources	0.89
Community Support and Involvement	0.91
Managing Student Conduct	0.91
Teacher Leadership	0.93
School Leadership	0.95
Professional Development	0.95
Instructional Practices and Support	0.83

Summary of TELL Maryland Validity and Reliability

Based on internal analysis of TELL Maryland Survey data, results indicate the most appropriate theoretical structure of the survey includes eight factors consisting of 73 questions.

Exhibit 6 provides questions within each construct generated from the reliability analyses. These eight constructs will be the basis for other analyses investigating how outcomes of interest are associated with teaching and learning conditions, as well as other sub-factors discussed earlier.

EXHIBIT 6. TELL MARYLAND CONSTRUCTS AND ITEMS		
Construct	**Number of Items**	**Items**
Time	6	Q2.1a, Q2.1c, Q2.1d, Q2.1e, Q2.1f, Q2.1g
Facilities and Resources	10	Q3.1a, Q3.1b, Q3.1c, Q3.1d, Q3.1e, Q3.1f, Q3.1g, Q3.1h, Q3.1i, Q3.1j
Community Support and Involvement	9	Q4.1a, Q4.1b, Q4.1c, Q4.1d, Q4.1e, Q4.1f, Q4.1g, Q4.1h, Q4.1i
Managing Student Conduct	8	Q5.1a, Q5.1b, Q5.1c, Q5.1d, Q5.1e, Q5.1f, Q5.1g, Q5.1h
Teacher Leadership	8	Q6.1a, Q6.1b, Q6.1c, Q6.1d, Q6.1e, Q6.1f, Q6.1g, Q6.5,
School Leadership	12	Q7.1a, Q7.1b, Q7.1c, Q7.1d, Q7.1e, Q7.1f, Q7.1g, Q7.1h, Q7.1i, Q7.1j, Q7.1k, Q7.1l
Professional Development	12	Q8.1a, Q8.1b, Q8.1c, Q8.1d, Q8.1e, Q8.1f, Q8.1g, Q8.1h, Q8.1i, Q8.1j, Q8.1k, Q8.1l
Instructional Practices and Support	8	Q9.1a, Q9.1b, Q9.1c, Q9.1d, Q9.1e, Q9.1f, Q9.1g, Q9.1h

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About the New Teacher Center

New Teacher Center focuses on improving student learning by accelerating the effectiveness of new teachers. NTC partners with states, school districts, and policymakers to design and implement systems that create sustainable, high-quality mentoring and professional development; build leadership capacity; work to enhance teaching conditions; improve retention; and transform schools in vibrant learning communities where all students succeed.

New Teacher Center

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